

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

SEAT NO

VENUE: _____

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

PMT0201 – MATHEMATICS II

(All sections/ Groups)

11 OCTOBER 2017
9.00 a.m. – 11.00 a.m.
(2 Hours)

Question	Marks
1	/10
2	/10
3	/10
4	/10
5	/10
Total	/50

INSTRUCTIONS TO STUDENTS

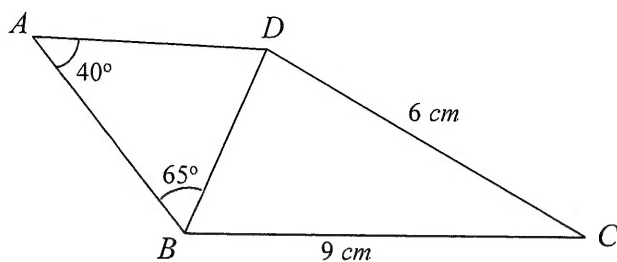
1. This question paper consists of **TWELVE** printed pages excluding cover page.
2. Answer **ALL FIVE** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the **QUESTION BOOKLET**. All necessary working steps **MUST** be shown.

Question 1

- a) Show that the point $\left(-\frac{5}{7}, -\frac{2\sqrt{6}}{7}\right)$ is on the unit circle. (2 marks)

- b) Find the exact value of $5 \cot^2 \left(\cos^{-1} \left(-\frac{3}{8} \right) \right)$. (2 marks)

- c) Diagram below shows a quadrilateral $ABCD$, with $BC = 9\text{ cm}$, $CD = 6\text{ cm}$, $\angle ABD = 65^\circ$ and $\angle BAD = 40^\circ$. The area of triangle BCD is 15 cm^2 . Calculate



- i) the acute angle, $\angle BCD$. Correct your answer to 2 decimal places. (2 marks)

- ii) the length BD . Correct your answer to 2 decimal places. (2 marks)

- iii) the length AD . Correct your answer to 2 decimal places. (2 marks)

Question 2

a) Given that $g(x) = -3 \tan\left(x - \frac{\pi}{2}\right) + 1$.

- i) Determine the amplitude, period, phase shift and vertical shift of $f(x)$. (2 marks)

- ii) Sketch the function $g(x) = -3 \tan\left(x - \frac{\pi}{2}\right) + 1$ for $0^\circ \leq x \leq 360^\circ$. Indicate clearly the vertical asymptotes and inflection points of the graph for $g(x)$. (3 marks)

b) Given $w = 5(\cos 25^\circ + i \sin 25^\circ)$ and $z = -1 - i$.

i) Find the polar form of z .

(3 marks)

ii) Hence, find the polar form of $\frac{w}{z}$. Leave the answer in the polar form. (2 marks)

Question 3

- a) Solve the equation $2\sin(2\theta) + \sqrt{2} = 0$ for $0^\circ \leq \theta \leq 360^\circ$. (2.5 marks)

- b) Compute the following limits. Show at least one intermediate step.

i) $\lim_{x \rightarrow \infty} \frac{5x - 8x^2 - 2x^3}{x^3 + 5}$ (2 marks)

ii) $\lim_{x \rightarrow 0} \frac{\tan(5x)}{\sin(2x)}$

(2.5 marks)

- c) Given the function $f(x) = \begin{cases} -\frac{k}{3x} & \text{if } x = 4 \\ \frac{\sqrt{x}-2}{x-4} & \text{if } x \neq 4 \end{cases}$ is continuous at $x = 4$, find the value of k . (3 marks)

Question 4

- a) Find the derivatives of the following functions. Show proper steps and simplify your answer.

i) $y = e^{-2x} \cos(2x)$

(3 marks)

ii) $y = \sin(6 - 2x^3 \ln x)$

(4 marks)

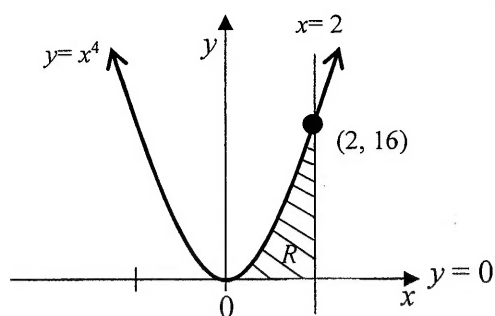
- b) The displacement of a ball is defined as $d(t) = \frac{1}{3}t^3 - 2t^2 + 3t$, where $d(t)$ is in meters and t is in seconds. Determine the displacement of the ball if the acceleration is equals to zero. (3 marks)

Question 5

- a) Find the definite integral $\int_{\frac{\pi}{4}}^{\frac{\pi}{3}} \frac{\sin x}{\cos x} dx$ using integration by substitution. Simplify your answer and express in exact value. (3 marks)

- b) Find the indefinite integral $\int \frac{x^2 + 1}{x(x+1)(x-1)} dx$ using partial fractions. (4.5 marks)

c) Let R in the diagram below be the region bounded by $y = x^4$, $x = 2$ and $y = 0$.



Find the area of the region R .

(2.5 marks)

End of Page